National Transportation Safety Board
Aviation Accident Final Report

Location:	CARIBBEAN SEA, CB	**Accident Number:**	ATL98GA127A
Date & Time:	09/18/1998, 1428 AST	**Registration:**	N6305U
Aircraft:	Government Aircraft Fact (GAF) N22S	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	1 Fatal, 1 Minor
Flight Conducted Under:	Part 91: General Aviation - Public Aircraft		

Analysis

Two U.S. Customs Service airplanes collided in formation cruise flight while being evacuated from Borinquen, Puerto Rico, to Curacao, Dutch Antilles, due to an approaching hurricane. While in cruise flight at 6,500 ft. msl, N6305U maneuvered closer to the lead airplane, N6302W, to take some photographs. Several minutes later, N6305U's right side of the vertical stabilizer collided with the left side of the nose of N6302W. N6305U was ditched while on short final to an airstrip due to a lack of airplane controllability, while N6302W returned to Borinquen and landed without incident. Prior to departure, the crewmembers of both airplanes were directed to fly as a flight of two. Neither of the second-in-commands (SICs) of either airplane had any previous formation flying training, nor was it approved for the flight. Interviews with U.S. Customs personnel revealed that formation flight occurred, as did photographs taken from the SIC aboard N6305U during the accident flight. The U.S. Customs Service required two pilots to operate the airplane due to mission equipment installation.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The failure of the pilot-in-command of N6305U to maintain physical clearance from the other aircraft (N6302W). Contributing factors were the inadequate visual lookout of all four pilots involved.

Findings

Occurrence #1: MIDAIR COLLISION
Phase of Operation: CRUISE

Findings
1. (C) CLEARANCE - NOT MAINTAINED - PILOT IN COMMAND
2. (F) VISUAL LOOKOUT - INADEQUATE - PILOT IN COMMAND
3. (F) VISUAL LOOKOUT - INADEQUATE - COPILOT/SECOND PILOT
4. (F) VISUAL LOOKOUT - INADEQUATE - PILOT OF OTHER AIRCRAFT

Occurrence #2: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: DESCENT - EMERGENCY

Findings
5. AIRCRAFT CONTROL - REDUCED

Occurrence #3: DITCHING
Phase of Operation: EMERGENCY DESCENT/LANDING

Findings
6. TERRAIN CONDITION - WATER

Factual Information

HISTORY OF FLIGHT

On September 18, 1998, at 1428 Atlantic Standard Time, two AeroSpace Technologies of Australia (Government Aircraft Factories) N22S Nomad airplanes, N6305U and N6302W, collided in midair during cruise flight over the Caribbean Sea, about 162 miles southwest of Puerto Rico. Both airplanes were operated by the U.S. Customs Service under the provisions of Title 14 CFR Part 91, and visual flight rules. Visual meteorological conditions prevailed, and a visual flight rules (VFR) flight plan was filed for the public use flight operating as a flight of two. The airline transport pilot-in-command (PIC) of N6305U was fatally injured, the airline transport second-in-command (SIC) received minor injures, and the airplane was substantially damaged. N6302W sustained minor damage, and the PIC and SIC, both airline transport certificated, were not injured. Origination of the flight was Borinquen, Puerto Rico, 58 minutes prior to the accident, with a planned destination of Curacao, Dutch Antilles.

Approximately 1000 on the day of the accident, the crewmembers of N6302W and N6305U were notified that a hurricane evacuation plan was in effect for Borinquen. Both airplanes needed to be evacuated from Puerto Rico to Curacao, in the Caribbean Sea, due to the approaching hurricane. Prior to departure, the crewmembers of both airplanes were directed to fly as a flight of two. N6302W was directed to be the lead airplane with responsibility for both navigation and radio communications. Due to the fact that neither of the SICs had received any previous ground or flight training in the N22S, the flights were to be used as initial training for both SICs assigned to the flight, as both PICs were instructor pilots.

At 1025 on the morning of the accident, the pilot assigned as PIC of N6302W received a weather briefing from the San Juan Automated Flight Service Station (AFSS), and filed a VFR flight plan as a flight of two. According to the PIC of the lead airplane, N6302W, both airplanes departed Borinquen approximately 1330. Five minutes after departure, the PIC of the lead airplane activated the VFR flight plan. According to Federal Aviation Administration (FAA) radio transcripts provided by San Juan Air Route Traffic Control Center (ARTCC), at 1403:17, the lead airplane contacted San Juan ARTCC and reported 17 miles north of DAKES intersection at 6,500 feet mean sea level (msl) en route to Curacao and requested flight following. The lead airplane was issued a transponder code of 0426.

The PIC of the lead airplane stated that approximately 10 minutes after departure, both airplanes were flying at an altitude of 6,500 feet above msl on a course of 210 degrees magnetic heading at 140 knots. The SIC of the lead airplane activated the autopilot with the heading and altitude selected. According to the PIC of the lead airplane, the PIC aboard N6305U contacted him over the radio and advised him that he was "on a loose trail" at their seven o'clock position and slightly lower.

Approximately 1425, while 120 miles south of Borinquen, the PIC of the trailing airplane, N6305U, advised the PIC of the lead airplane that he was going to "come in closer in order to take a photograph of [N6302W]," to which the PIC of N6302W acknowledged. The PIC of the lead airplane then moved forward in his seat and observed the trailing airplane at his eight o'clock position and slightly lower. At that time, the PIC of the lead airplane considered both airplanes to be at a "safe distance" from each other, and moved back in his seat.

According to the SIC aboard the trailing airplane, he recalled the autopilot being engaged. He

asked the PIC to disengage the autopilot so that he could hear the alert sound of the autopilot disengagement. The PIC acknowledged his request and disengaged the autopilot. According to the SIC, the autopilot was then re-engaged. He recalled taking several photographs, then asking the PIC a question regarding the airplane's instrumentation. After several minutes, he looked outside the cockpit to the right and realized that their airplane was seconds from colliding with the lead airplane. He stated that the trailing airplane was slightly ahead of N6302W and "closing to the right at a fast pace." He then heard a loud bang.

According to the PIC aboard the lead airplane, approximately one to two minutes after moving back in his seat, he "felt an impact on the lower front section" of the airplane. He called the PIC of the trailing airplane over the radio and stated, "Are you crazy? You hit us." Seconds later, he observed the trailing airplane in a nose down position turning toward the northwest. According to the SIC aboard the trailing airplane, N6305U's nose dropped and rolled rapidly to the right. He recalled that the PIC advised the flight crew of the lead airplane that he thought the autopilot was engaged and didn't realize that the two airplanes had gotten so close.

At 1427:30, the lead airplane advised San Juan ARTCC, "Ah mayday mayday mayday zero two whiskey oh our second unit had made contact with us going into the wa..." The controller advised him that search and rescue personnel would be notified. At 1433:57, the pilot advised ARTCC that the trailing airplane was attempting to turn north and was having difficulty controlling the airplane. He requested permission to follow his company airplane, which was approved. The controller advised the lead airplane that he did not have their company airplane in radar contact.

After the collision, the PIC performed a manual test of N6302W's flight controls, and stated that no operational discrepancies were noted. After verifying that the airplane was still controllable, the crew initiated a search for the trailing airplane. They attempted to contact the crew of N6305U over the radio, and the PIC of the trailing airplane responded that they were flying at an altitude of 1,900 feet msl at 90 knots on a west/northwest heading.

The flight crew of the lead airplane was able to establish visual contact with the trailing airplane. The PIC of N6302W provided bearing and range information in an attempt to direct N6305U to the southwest corner of Puerto Rico. Approximately 50 nautical miles southwest of Borinquen, the PIC of the trailing airplane advised that he had visual contact with Mona Island, and that he was going to attempt an emergency landing on the island's airstrip.

However, according to the SIC aboard the trailing airplane, the airplane was nearly aligned with the dirt runway when the rate of descent increased and the airplane began to oscillate uncontrollably. Concerned that the airplane might explode on impact with the ground, the PIC considered landing on the shoreline, then made the decision to ditch the airplane in the water approximately one hundred yards south of Mona Island. According to the SIC, they "lost control" of the airplane while approaching the water, and the PIC asked for help in flaring for the landing. Upon impact, the airplane nosed over and submerged under 8 to 10 feet of water. The SIC extricated himself from the airplane; the PIC did not.

The PIC of the lead airplane was able to maintain control of the airplane and returned to Borinquen. He circled above the airport for approximately 40 minutes and performed the normal and emergency checklists. He was able to extend all three of the landing gear to the down and locked position. A U.S. Coast Guard helicopter performed an aerial check of N6302W and confirmed that there was minor damage to the airplane's nose and the surface

radar housing. N6302W landed on runway 8 without further incident.

PERSONNEL INFORMATION

The PIC aboard the trailing airplane, N6305U, was found by the rescue swimmers to be seated in the right seat. He held an airline transport pilot's certificate dated January 26, 1995, with airplane single and multiengine ratings. He also held a flight instructor's license in single and multiengine land airplanes, and a type rating in the PA-42R. In addition, he possessed a first class airman medical certificate, dated December 2, 1997, with a restriction for wearing corrective lenses.

His initial training in the N22S was accomplished in August of 1990. On April 30, 1998, he completed a training program to act as PIC of the N22S. He was also designated as an instructor pilot in the N22S by the Branch Chief of the U.S. Customs Service. His last Federal Aviation Regulation (FAR) 61.56 flight review was conducted on February 12, 1998. He was hired by the U.S. Customs Service in October of 1988 as a Marine Enforcement Officer, and was promoted to a pilot position in November of 1992. He had successfully completed water survival training, emergency egress training, and aircrew coordination training. According to the U.S. Customs Service, he had flown a total of 4,286 hours, 982 of which were in the N22S.

The SIC aboard the trailing airplane stated that at the time of the accident, he was seated in the right seat (according to several rescue swimmers, the PIC was found in the right seat). He holds an airline transport pilot's certificate dated October 3, 1997, with an airplane multiengine land rating and commercial privileges in airplane single engine land. He also holds type ratings in the ATR-42, ATR-72, and SD-3. In addition, he possesses a first class airman medical certificate, dated September 14, 1998, with a restriction for wearing corrective lenses. His last FAR 61.56 flight review was conducted on October 3, 1997. At the time of the accident, he had flown a total of 5,932 hours, none of which were in the N22S. He was hired by the U.S. Customs Service on February 8, 1998. Prior to the accident, he had received no water survival training, no ground training in the N22S, and no emergency egress training.

The PIC aboard the lead airplane, N6302W, was seated in the right seat. He holds an airline transport pilot's certificate, dated October 29, 1983, with airplane single/multi-engine land and instrument ratings. He also holds a flight instructor certificate with single/multi-engine land and instrument ratings, and a flight engineer certificate in turbojet powered aircraft. In addition, he possesses a second class airman medical certificate, dated April 27, 1998, with a limitation for wearing corrective lenses. His last FAR 61.56 flight review was accomplished on April 28, 1998, which was also an annual flight evaluation in the N22S. He was designated as an instructor pilot in the N22S by the Branch Chief of the U.S. Customs Service. At the time of the accident, he had flown a total of 6,908 hours, 1,430 hours of which were in the N22S.

The SIC aboard the lead airplane was seated in the left seat. He holds an airline transport pilot's certificate, dated January 19, 1997, with airplane single/multi-engine land and instrument ratings. He also holds a flight instructor certificate with single/multi-engine land and instrument ratings. In addition, he possesses a first class airman medical certificate, dated August 24, 1998, with a limitation for wearing corrective lenses. According to his employer, his last FAR 61.56 flight review was accomplished in July of 1998. At the time of the accident, he had flown a total of 5,710 hours, none of which were performed in the N22S. He had received no training in the N22S prior to the date of the accident, and was not designated or qualified in the N22S by the Branch Chief of the U.S. Customs Service.

AIRCRAFT INFORMATION

N6305U, a N22S (S/N F-160), was manufactured by Aerospace Technologies of Australia in 1983. In 1988, the airplane was converted to the Search Master configuration in preparation for public use by the U.S. Customs Service Air Program. It was equipped with two Allison 250-B17E engines, rated at 420 shaft horse power, two Hartzell 3-blade, constant speed, manual and automatic feathering, and beta/reverse propellers, and retractable landing gear. The airplane was originally certified for one pilot; however, it had provisions for two pilots. Due to the mission equipment installation, the U.S. Customs Service required two pilots to operate the airplane.

The last B/100 and C/300-hour maintenance inspections of the aircraft were performed on June 4, 1998. At the time of the accident, the airframe had accrued a total time in service of 2,924.2 hours. Engine no. 1 and engine no. 2 had accrued 2,156.2 and 1,774.0 hours, respectively. Verification with the airplane manufacturer and the aircraft logbooks revealed that all Airworthiness Directives (ADs) and Service Bulletins (SBs) were in compliance.

N6302W, also a N22S (S/N F-159), was manufactured by Aerospace Technologies of Australia in 1983. In 1987, the airplane was converted to the Search Master configuration for public use by the U.S. Customs Service Air Program. It was equipped with two Allison 250-B17E engines, rated at 420 shaft horse power, two Hartzell 3-blade, constant speed, manual and automatic feathering, and beta/reverse propellers, and retractable landing gear.

At the time of the accident, the last B/100 hour maintenance inspections on the engine and airframe were accomplished on August 10, 1998. The airframe had accrued a total time in service of 3,082.9 hours. Engine no. 1 and engine no. 2 had accrued 2,391.0 and 2,232.9 hours, respectively. The airframe and engines had accrued 42.9 hours since the last inspections were performed. A review of airplane's maintenance records revealed that all ADs and SBs were in compliance.

METEOROLOGICAL INFORMATION

According to the PIC aboard N6302W, visual meteorological conditions prevailed at the time the midair collision occurred. There were scattered clouds at 1,500 feet with tops to 5,000 feet and clear skies above, visibility of 15 miles, calm winds, and a temperature of 25 degrees C. (77 degrees F.). According to him, the weather with regard to the accident "was not a factor."

WRECKAGE AND IMPACT INFORMATION

According to the crewmembers aboard the lead airplane, the right side of the vertical stabilizer of the trailing airplane collided with the left side of the nose of the lead airplane. According to several witnesses in chase airplanes, a section of the vertical stabilizer and rudder assembly of the trailing airplane were bent over to the left and rested parallel to the upper surface of the left hand side of the horizontal stabilizer. The rudder fairing and counter weight assembly detached completely. The rudder's upper hinge also separated; however, the rudder remained attached at the lower hinge. Several witnesses in chase airplanes observed N6305U exhibiting "dutch roll-type movements" prior to ditching in the water. Following the hurricane, several sections of N6305U drifted on-shore and came to rest on the beach. The wings, tail and the horizontal stabilizer were not recovered.

Damage sustained to N6302W was limited to the nose section. The pitot head was bent inward, the aft section of the radome cover was separated, and the forward section of the

radome was cracked.

No mechanical discrepancies were reported by the PIC of the trailing airplane prior to the collision, and no mechanical discrepencies were found with the trailing airplane following the collision.

TESTS AND RESEARCH

According to radar data provided by the FAA from the time period between 1420:00 to 1430:00, N6302W and N6305U were transmitting transponder codes of 0426 and 5105, respectively. According to the data, which provided radar targets transmitted every 12 seconds, the lead airplane and the trailing airplane were traveling on southwest headings at ground speeds of approximately 150 knots. Between 1420:00 to 1426:36, the ground tracks crossed several times while the horizontal distances between the airplanes varied. Between 1426:24 to 1428:24, no transponder signals with the code of 0426 were transmitted. At 1428:24, the signal for 0426 reappeared, with the lead airplane traveling in a westerly direction and initiating a turn to the right. Twelve seconds later, the last transponder signal for the trailing airplane was received.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the PIC of the trailing airplane, N6305U, on September 19, 1998, by the Gobierno de Puerto Rico's Instituto de Ciencias Forenses in San Juan, Puerto Rico. Toxicological results for alcohol and drugs were negative.

Toxicological protocols were also performed on the SIC of N6305U and the PIC and SIC of N6302W. Results for alcohol and drugs were negative.

ADDITIONAL INFORMATION

According to the U.S. Customs Service, the crew aboard the trailing airplane had been briefed prior to their departure to fly as a flight of two; however, they had not been briefed on specific formation procedures. Neither one of the two SICs had any previous experience in formation flying activities. Interviews with the three surviving crewmembers revealed that formation flight did occur, which was verified by photographs taken by the SIC aboard N6305U during the accident flight. The crewmembers indicated that there was no formation flying briefing among the four pilots, only a discussion between the two PICs. The two crewmembers aboard the trailing airplane had been provided personal survival equipment; however, according to company records, an inspection of the PIC's personal survival equipment was overdue.

When the approaching hurricane was initially announced, the U.S. Customs Service asked for pilot volunteers to reposition airplanes off the island. According to the SIC of the trailing airplane, he did not initially volunteer for the mission due to the fact that he was "not qualified in the airplane." According to him, he was advised at 1015 that morning that he would be assigned to fly as SIC of the trailing airplane, and that he would receive initial flight training while en route to Curacao.

In addition to the Federal Aviation Administration, parties to the investigation were the U.S. Customs Service and Boeing Aircraft.

N6305U and N6302W were released to a representative with the U.S. Customs Service on May 26, 1999.

Pilot Information

Certificate:	Airline Transport	**Age:**	43, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Valid Medical--w/ waivers/lim.	**Last FAA Medical Exam:**	02/12/1997
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	4286 hours (Total, all aircraft), 982 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Government Aircraft Fact (GAF)	**Registration:**	N6305U
Model/Series:	N22S N22S	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	F-160
Landing Gear Type:	Retractable - Tricycle	**Seats:**	5
Date/Type of Last Inspection:	06/04/1998, Continuous Airworthiness	**Certified Max Gross Wt.:**	9100 lbs
Time Since Last Inspection:	61 Hours	**Engines:**	2 Turbo Prop
Airframe Total Time:	2983 Hours	**Engine Manufacturer:**	Allison
ELT:	Installed, not activated	**Engine Model/Series:**	250-B17E
Registered Owner:	US CUSTOMS AVIATION OPNS DIV	**Rated Power:**	420 hp
Operator:	US CUSTOMS SERVICE	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	, 0 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	0000	**Direction from Accident Site:**	0°
Lowest Cloud Condition:	Clear / 0 ft agl	**Visibility**	15 Miles
Lowest Ceiling:	None / 0 ft agl	**Visibility (RVR):**	0 ft
Wind Speed/Gusts:	Calm /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:		**Temperature/Dew Point:**	25°C
Precipitation and Obscuration:			
Departure Point:	BORINQUEN, PR (BQN)	**Type of Flight Plan Filed:**	VFR
Destination:	CURACAO, OF (NCC)	**Type of Clearance:**	VFR; VFR on top
Departure Time:	1330 AST	**Type of Airspace:**	Class G

Airport Information

Airport:	RAFAEL HERNANDEZ AIRPORT (BQN)	**Runway Surface Type:**	Dirt
Airport Elevation:	238 ft	**Runway Surface Condition:**	Dry
Runway Used:	30	**IFR Approach:**	None
Runway Length/Width:	3000 ft / 50 ft	**VFR Approach/Landing:**	Forced Landing; Straight-in

Wreckage and Impact Information

Crew Injuries:	1 Fatal, 1 Minor	**Aircraft Damage:**	Destroyed
Passenger Injuries:	N/A	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal, 1 Minor	**Latitude, Longitude:**	

Administrative Information

Investigator In Charge (IIC):	PRESTON E HICKS	**Report Date:**	01/18/2001
Additional Participating Persons:	JOAQUIN PUNTONET; SAN JUAN, PR MICHAEL K POWELL; GUAYNABO, PR		
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov, or at 800-877-6799. Dockets released after this date are available at http://dms.ntsb.gov/pubdms/.		